



Patent  
Attorney's Docket No. 009683-357

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of ) AF  
Daisaku HORIE )  
Application No.: 09/531,494 ) Group Art Unit: 2625  
Filed: March 20, 2000 ) Examiner: Yon Jung Couso  
For: IMAGE PROCESSING DEVICE AND ) Confirmation No.: 5477  
IMAGE PROCESSING METHOD FOR )  
CORRECTION OF IMAGE )  
DISTORTION )

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Technology Center 2600

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated January 30, 2004, Applicant respectfully requests reconsideration and withdrawal of the rejections of the claims. The allowance of claims 9-11, and the indication that claim 16 contains allowable subject matter, is noted with appreciation.

The Examiner is thanked for the courteous interview conducted with Applicant's undersigned representative. The substance of that interview is reflected in the following remarks.

Claims 1-3, 6, and 17-19 were rejected under 35 U.S.C. § 102, on the grounds that they were considered to be anticipated by the Cullen et al. patent, and claims 4, 5, 7, and 8 were rejected under 35 U.S.C. § 103, as allegedly being unpatentable over the Cullen patent in view of the Mackinnon et al. patent.

Claim 1 recites an image processing device having, among other elements, an edge detection unit to detect edge data in image data, and a rotation unit “to rotate said detected edge data.” Referring to Fig. 7 of the application, for example, the edge data in the image is detected, and this edge data is then rotated, as indicated by the counter clockwise arrows. Claim 1 further recites an operation unit to derive a characteristic amount “of said rotated edge data.” Referring to Fig. 9, this characteristic amount is represented by the horizontal and vertical projection histograms 227 and 229. Finally, claim 1 recites a unit to detect the inclination angle of the original image data “based on said derived characteristic amount.”

In summary, therefore claim 1 recites an image processing device in which edge data is first detected, this detected edge data is then rotated, and a characteristic amount is derived from the *rotated* edge data. Based upon this characteristic amount, the inclination angle of the image is determined. Claim 17 recites the corresponding method steps.

In rejecting claim 1, the Office Action states that the Cullen patent discloses an edge detection unit 204 (Fig. 2c), a rotation unit 207, an operation unit 603 to derive a characteristic amount, and an inclination unit 604 to detect the inclination angle of the image data. It is respectfully submitted, however, that even if the Cullen patent can be interpreted to disclose each of these individual elements, they do not cooperate with each other in the same manner as recited in claim 1 to produce the claimed result. As shown in Fig. 2c of the Cullen patent, the rotation of the edge data, which is identified as step 207 in the Office Action, occurs after step 206, which corresponds to the flow chart of Fig. 6 (see column 2, lines 54-56). Consequently, step 603 of Fig. 6, which was identified in the Office Action as corresponding to the derivation of a characteristic amount, occurs *before* the rotation of step 207. Thus, the Cullen patent does not teach that the characteristic amount determined in step 603 is based upon *rotated* edge data. Rather, in contrast to the subject matter recited in claim

1, the Cullen patent discloses a technique in which the inclination angle is first detected, and the rotation only occurs after such a determination has been made.

As a result, the reference cannot be deemed to anticipate the subject matter of claim 1, since it does not disclose an operation unit to derive a characteristic amount “of said rotated edge data,” and determination of the inclination angle on the basis of such a characteristic amount. For similar reasons, it does not anticipate the method of claim 17, which recites the step of deriving a characteristic amount “of said rotated edge data”, and correcting inclination based on that derived characteristic amount. Accordingly, it is respectfully submitted that claims 1-8 and 17-19 are patentable over the teachings of the Cullen reference, whether considered by itself or in combination with the McKinnon patent.

Claim 12-14 were rejected under 35 U.S.C. § 102, on the grounds that they were considered to be anticipated by the Morimura patent, and claim 15 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over the Morimura patent. Claim 12 recites an image processing device having an image receiving unit and two correction units. One of these correction units is a swing correction unit, to correct distortion caused by swing of the camera with respect to an original image, and the other is a skew correction unit, to correct distortion caused by skew of the camera with respect to the original image. In relevant part, the Office Action alleges that the Morimura patent teaches a swing correction unit, with reference to Fig. 16.

As pointed out in Applicant's previous response, the flow chart depicted in Fig. 16 of the Morimura patent pertains to an operation for controlling a zoom lens, so as to provide an optimum enlargement ratio. Thus, the operation of Fig. 16 controls the translation of the zoom lens along the optical axis. There is no teaching in the Morimura patent that this

operation corrects for any type of distortion. Rather, its function is to control the *size* of the object, e.g. document, within the captured image.

During the course of the above-noted interview, the concept of swing correction was explained. In the context of the present invention, the term "swing" is being used in accordance with its ordinary and accustomed meaning, namely pivoting about an axis, or movement through an arc. Referring to Fig. 13, as well as page 24, lines 1-9, swing is described in the application as rotation in the direction  $\gamma$  about the x-axis, and rotation in the direction  $\alpha$  about the y-axis. Movement of the camera in these directions, relative to the object being photographed, distorts the image into a trapezoidal shape.

It is respectfully submitted that Fig. 16 of the Morimura patent does not relate to the correction of this type of distortion. In responding to Applicant's arguments along these lines during the above-noted interview, the Examiner indicated that she was interpreting the term "swing" very broadly, to include the zooming of the camera along its optical axis. It is respectfully submitted, however, that a person of ordinary skill in the art would not interpret the term "swing" to cover this type of movement. As noted above, and as described in the application, the term "swing" connotes movement about an axis, through an arc. No such movement occurs in the operation depicted in Fig. 16 of the Morimura patent. Rather, the only movement that takes place is the *linear* translation of the lens along the optical axis.

Furthermore, the zooming of the lens does not function to correct any type of *distortion* in the image. The sole function of the zooming is to obtain the optimum magnification ratio, so that the image of the document fills the viewing area as much as possible.

In summary, therefore, while the Morimura patent discloses a skew correction unit, it does not contain any disclosure relating to swing of the camera, nor correction of distortion

caused by such swing. If anything, the patent suggests that the camera 3 is fixedly mounted on the post 2 (see Figs. 1, 3 and 4, for example) and therefore is not capable of swinging relative to the document being imaged. In any event, there is no disclosure suggesting that the operation depicted in Fig. 16 corrects any type of distortion in the image.

For the foregoing reasons, it is respectfully submitted that claims 12-15 are neither anticipated, nor otherwise suggested, by the Morimura patent.

Reconsideration and withdrawal of the rejections, and allowance of all pending claims are respectfully requested.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

Date: 7-8-04

By:   
James A. LaBarre  
Registration No. 28,632

P.O. Box 1404  
Alexandria, Virginia 22313-1404  
(703) 836-6620